

CLAIMS

1. A method of inspecting an artefact using a coordinate measuring apparatus in which an artefact-sensing probe is moved into a position-sensing relationship with each artefact and a position reading taken, the method comprising the following steps in any suitable order:
 - measuring an artefact with an artefact-sensing probe in contact mode;
 - scanning said artefact with an artefact-sensing probe in non-contact mode;
 - generating an error map or function corresponding to the difference between the measurement taken with the artefact-sensing probe in contact mode and the artefact-sensing probe in non-contact mode; and
 - using the error map or function to correct subsequent measurements with the artefact-sensing probe in non-contact mode.
2. A method according to claim 1 wherein the step of measuring said artefact with an artefact-sensing probe in contact mode comprises scanning said artefact.
3. A method according to any preceding claim wherein the artefact is scanned with the artefact-sensing probe in non-contact mode with the artefact-sensing probe at a nominal offset from the artefact.
4. A method according to any preceding claim wherein the error map or function is used to calibrate the artefact sensing probe in non-contact mode to thereby produce a radial correction for a nominal distance and direction of the artefact sensing probe relative to the

artefact surface.

5. A method according to any of claims 1-3, comprising the additional steps of:

- 5 measuring subsequent artefacts with the artefact measuring probe in non-contact mode; and
 correcting the measurements of subsequent artefacts using the error map.

- 10 6. A method according to any preceding claim wherein the artefact-sensing probe in contact mode and the artefact-sensing probe in non-contact mode comprise a single artefact-measuring probe with both contact and non-contact modes.

- 15 7. A method according to any of claims 1-5 wherein the artefact-sensing probe in contact mode and the artefact-sensing probe in non-contact mode comprise separate probes.

- 20 8. A method according to any preceding claim wherein the artefact is measured with the artefact-sensing mode in contact mode at a slow speed and with the artefact-sensing mode in non-contact mode at the desired speed
25 of measurement of subsequent artefacts.

9. A method according to claim 8 wherein the speed of measurement of subsequent artefacts is a fast speed.

- 30 10. A method according to any preceding claim wherein the artefact is measured with the artefact-sensing probe in contact mode using a high accuracy reference co-ordinate measuring apparatus and the artefact is measured with the artefact-sensing probe in non-contact

mode using a repeatable co-ordinate measuring apparatus.

11. A method according to any preceding claim wherein
5 the measurements of the artefact gained from measurement with the artefact-sensing probe in contact mode are used to calculate a path for the artefact-sensing probe in non-contact mode to follow.
- 10 12. A method according to any of claims 1-10 wherein the path for the artefact sensing probe in non-contact mode is ascertained using predefined features of the workpiece.
- 15 13. Apparatus for inspecting an artefact using a coordinate measuring apparatus and at least one artefact sensing probe, the apparatus comprising a controller adapted to perform the following steps in any suitable order;
- 20 (a) measuring an artefact with an artefact-sensing probe in contact mode;
- (b) measuring said artefact with an artefact-sensing probe in non-contact mode;
- (c) generating an error map or function
25 corresponding to the difference between the measurements taken with the artefact measuring probe in contact mode and the artefact measuring probe in non-contact mode;
- (d) measuring subsequent artefacts with the
30 artefact measuring probe in non-contact mode; and
- (e) correcting the measurement of subsequent artefact using the error map or function.
14. Apparatus for inspecting an artefact using a

coordinate measuring apparatus and at least one artefact sensing probe, the apparatus comprising a controller adapted to perform the following steps in any suitable order:

- 5 measuring an artefact with an artefact-sensing probe in contact mode;
 scanning said artefact with an artefact-sensing probe in non-contact mode;
 generating an error map or function corresponding
10 to the difference between the measurement taken with the artefact-sensing probe in contact mode and the artefact-sensing probe in non-contact mode; and
 using the error map or function to correct subsequent measurements with the artefact-sensing probe
15 in non-contact mode.

15. Apparatus according to claim 14 wherein the step of measuring said artefact with an artefact-sensing probe in contact mode comprises scanning said artefact.

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16. Apparatus according to any of claims 14 or 15 wherein the artefact is scanned with the artefact-sensing probe in non-contact mode with the artefact-sensing probe at a nominal offset from the artefact.

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17. Apparatus according to any of claims 14-16 wherein the error map or function is used to calibrate the artefact sensing probe in non-contact mode to thereby produce a radial correction for a nominal distance and
30 direction of the artefact sensing probe relative to the artefact surface.

18. Apparatus according to any of claims 14-16, comprising the additional steps of:

measuring subsequent artefacts with the artefact measuring probe in non-contact mode; and

correcting the measurements of subsequent artefacts using the error map.

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19. Apparatus according to any of claims 14-18 wherein the artefact is measured with the artefact-sensing mode in contact mode at a slow speed and with the artefact-sensing mode in non-contact mode at the speed of measurement of subsequent artefacts.

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20. Apparatus according to claim 19 wherein the speed of measurement of subsequent artefacts is a fast speed.

15 21. Apparatus according to any of claims 14-20 wherein the measurements of the artefact gained from measurement with the artefact-sensing probe in contact mode are used to calculate a path for the artefact-sensing probe in non-contact mode to follow.

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22. Apparatus according to any of 14-20 wherein the path for the artefact sensing probe in non-contact mode is ascertained using predefined features of the workpiece.